CITY OF NAMPA (PWS 3140080)

SOURCE WATER ASSESSMENT REPORT

June 15, 2006

State of Idaho
Department of Environmental Quality

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Executive Summary

The Environmental Protection Agency (EPA), under the Safe Drinking Water Act Amendments of 1996, is requiring the State of Idaho to assess the potential susceptibility to contamination of all public water systems (PWS).

The primary objective of these source water assessments is to provide information that public water systems can use to develop and implement local Drinking Water Protection Plans. By evaluating land use, system construction, and existing hydrologic and geologic conditions, systems are scored *high*, *medium*, or *low* in terms of their susceptibility to contamination.

What Was Assessed

This report evaluates Well 14 and Well 17 Carriage Hills of the City of Nampa community water system (PWS No. 3140080), located just in Canyon County, Idaho. The system serves approximately 63,800 people through 18,830 metered connections. Previous Source Water Reports have assessed the other wells on this system, and they are available from DEQ upon request.

How Susceptibility Scores Were Determined

Well susceptibility was scored in three areas:

- Well system construction
- Land use (type and amount) above the well's aquifer. Land use can differ among wells, so separate scores are given for each of four types of contaminants:
  - Inorganic contaminants (IOCs), such as nitrates and arsenic
  - Volatile organic contaminants (VOCs), such as petroleum products
  - Synthetic organic contaminants (SOCs), such as pesticides
  - Microbial contaminants, such as bacteria
- Hydrologic and geologic conditions surrounding the well

Scores for This Assessment

The final scores are as follows:

Drinking Water Source	Susceptibility Scores[1]									
	System Construction	Potential Contaminant Inventory/Land Use				Hydrologic Sensitivity	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well 14	L	M	M	M	M	M	M	M	M	M
Well 17 Carriage Hills	L	M	M	M	M	M	H*	H*	H*	H*

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
H* = automatically high susceptibility due to potential contaminants existing within 50 feet of the well

Final susceptibility for Well 14 rated **moderate** for IOCs, VOCs, SOCs and microbial contaminants. Final susceptibility for Well 17 Carriage Hills rated **automatically high** for IOCs, VOCs, SOCs and microbial contaminants. The automatically high susceptibility ratings are due to potential contaminant sources (GWUDI, 2002 and 2003) existing within 50 feet of the wellhead. If not for the automatically high susceptibility ratings, Well 17 Carriage Hills would have rated moderate for all four potential contaminant categories.

Hydrologic sensitivity rated **moderate susceptibility** and system construction rated **moderate susceptibility** for both wells. Based upon the number and type of potential contaminant sources found within three time-of-travel zones (zones indicating the number of years necessary for a particle of water to reach a well), land use for both

wells rated **moderate susceptibility** for IOCs, VOCs, SOCs, and microbial bacteria. See Table 3 and Table 4, page 14, for a complete listing of these sources.

Summary of Laboratory Test Results for the System

A review of the system's laboratory tests, using the Safe Drinking Water Information System State (SDWISS), revealed the following:

- Tested water revealed no VOCs, SOCs, or repeat detections of microbial bacteria in Well 14 or Well 17 Carriage Hills.
- The IOCs arsenic, fluoride, sodium, thallium, and nitrates have been detected in tested water. Concentrations of each potential contaminant are below maximum contaminant levels.

How to Use These Results

This assessment is provided as information regarding City of Nampa's drinking water and should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source.

DEQ strongly encourages each PWS to use the assessment report to develop a *Source Water Protection Plan*, which is a community-derived and proactive strategy to protect drinking water. Protection plans can help avoid drinking water contamination and reduce expensive treatment/replacement costs.

Protection plans can also help educate the served community. Many people have an "out of sight, out of mind" mentality, but improper disposal of certain chemicals can cause health impacts. For instance, concentrations of some contaminants, as small as a few parts-per-billion, can be higher than allowable limits.

These results should not be used as an absolute measure of risk, nor should they be used to undermine public confidence in the water system. A particular rating DOES NOT imply that any regulatory or legal actions will occur.

Suggested Activities to Protect Your Drinking Water

Drinking water protection activities should first focus on correcting any deficiencies outlined in the *sanitary survey*. Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies, even though these strategies may not yield results in the near term.

System operators should do the following:

- Maintain a 50-foot radius (IDAPA 58.01.08.900.01) clear of all potential contaminants around the wellhead. If the pump house resides within this distance. It is important to keep the pump house clean and to not store disinfection chemicals or other chemicals there. The 50-foot buffer also reduces potential contamination related to chemical application or irrigation practices; the water system should restrict chemical application and activities near the wellhead.
- Identify and consider all possible sources of contamination not identified in this report, such as septic system effluent and document those sources to identify potential contaminant threats that could impact the City of Nampa drinking water wells.
- Correct any deficiencies included in the sanitary surveys—such as proper venting, drainage, and smooth nosed sample taps—as part of the water system's drinking water protection efforts.
- Carefully monitor and deal with any contaminant spills within the well's capture zone.
- Work with state and local agencies if the well's capture zone(s) are outside the direct jurisdiction of your PWS.
- Locate new wells in areas with as few potential sources of contamination as possible, and ensure that each new site is reserved and protected.

A strong public education program should also be a primary focus of any drinking water protection plan, as most well capture zones contain at least some urban and residential land uses. Public education topics could include:

- Proper lawn and garden care practices
- Household hazardous waste disposal methods
- Proper care and maintenance of septic systems
- The importance of water conservation

Resources and Assistance

There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil and Water Conservation District, and the Natural Resources Conservation Service.

For assistance in developing protection strategies, contact DEQ's Boise Regional Office or the Idaho Rural Water Association.

Boise Regional DEQ Office	(208) 373-0550
State DEQ Office	(208) 373-0502

Website: http://www.deq.idaho.gov/

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper (mlharper@idahoruralwater.com), Idaho Rural Water Association, at 1-208-343-7001 for assistance with drinking water protection (formerly wellhead protection) strategies.

SOURCE WATER ASSESSMENT FOR THE CITY OF NAMPA WATER SYSTEM IN CANYON COUNTY, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are shown in Figure 1. The list of significant potential contaminant source categories used to develop the assessment is included as Table 3 in Appendix A.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess every public water system (PWS) source in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area; sensitivity factors associated with the drinking water source, and local aquifer characteristics. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water supply system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the PWS.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ also encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community and be based upon its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

City of Nampa, PWS# 3140080, is a community drinking water system located in Canyon County (Figure 1). The water system serves about 63,800 people through 26,121 metered connections.

According to the State Safe Drinking Water Information System, no volatile organic contaminants (VOCs), synthetic organic contaminants (SOCs), or microbial bacteria have ever been detected in Well 14 or Well 17 Carriage Hills. The inorganic contaminants (IOCs) arsenic, fluoride, sodium, thallium, and nitrates have been detected in tested water; however concentrations of each have been below maximum contaminant levels (MCLs) set by the Environmental Protection Agency (EPA).

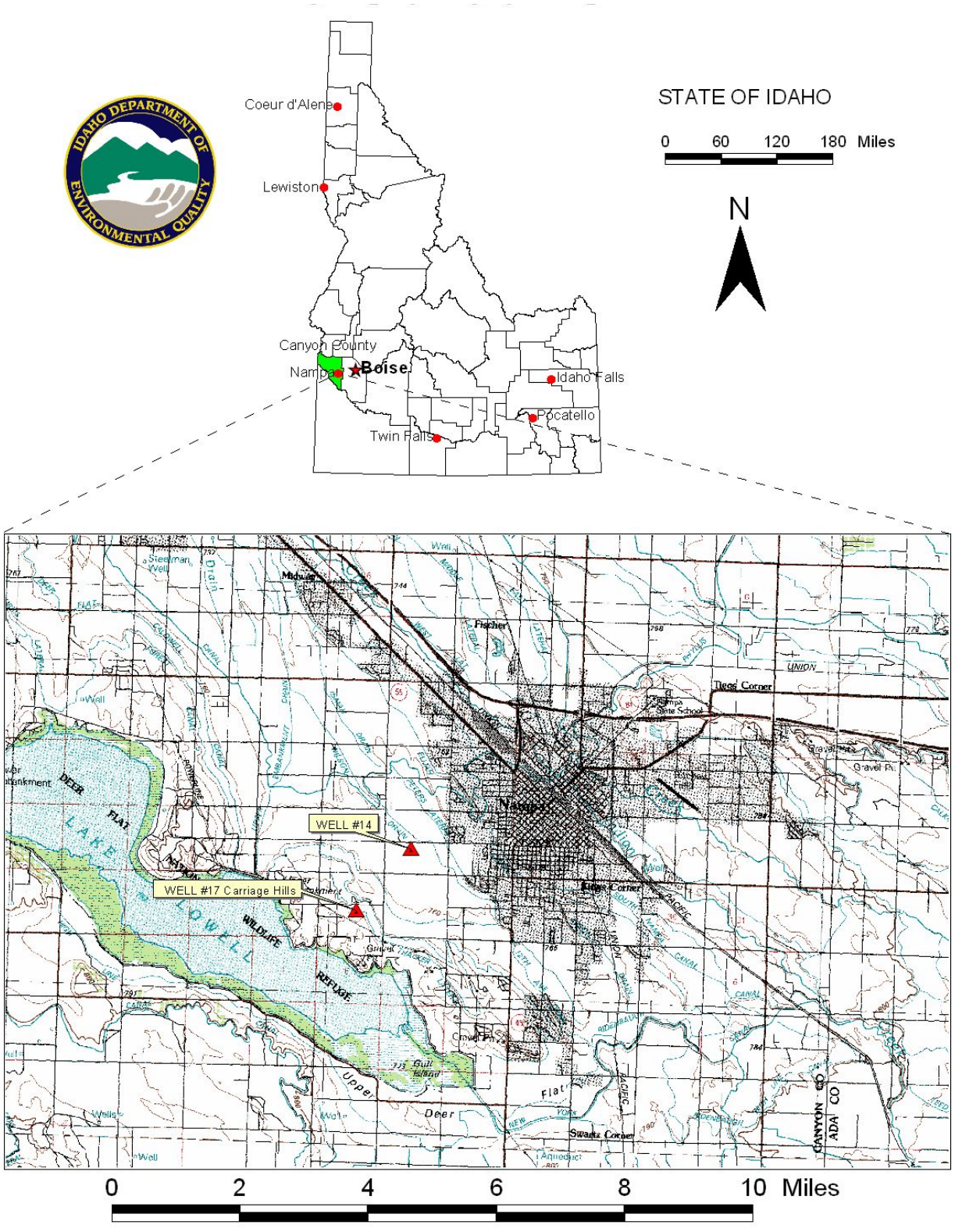

Figure 1. Geographic location of City of Nampa, PWS# 3140080.

Defining the Zones of Contribution—Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a pumping well) for water in the aquifer.

DEQ defined the zones of water contribution by using a refined computer model approved by the EPA in determining the 3-year (Zone IB), 6-year (Zone II), and 10-year (Zone III) TOT zones for water associated with the City of Nampa water system.

The computer model used site-specific data, assimilated from a variety of sources, including well logs (when available) and hydrogeologic reports.

Generally, ground water in this area flows in a northwesterly direction.

These City of Nampa Water System Wells are completed in sands at depths between 188 feet below ground surface (bgs) and 380 feet bgs (Well 14) and 261 feet bgs and 431 feet bgs (Well 17 Carriage Hills). Both delineations extend approximately 1.5 miles southeastward and encompasses an area up to approximately 1.2 miles wide (see Figures 2 and 3). The actual data used to determine the source water assessment delineation area is available from DEQ upon request (DEQ, 2005).

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources.

The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The potential contaminant source locations within the delineation areas were obtained from existing databases and field surveys conducted by DEQ.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used by the facility. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation.

There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory for Well 14 and Well 17 Carriage Hills was conducted during November and December 2005. For reference, the well location, TOT zones, and potential contaminant sources are included in Figure 2 and 3, and Appendix A, Table 3 and 4.

- The first phase involved identifying and documenting potential contaminant sources within the water system's source water assessment area through the use of computer databases and geographic information system (GIS) maps developed by DEQ.
- The second phase, or *enhanced*, portion of the inventory involved contacting the water system. At the time of the enhanced inventory, no additional potential contaminant sources were identified.

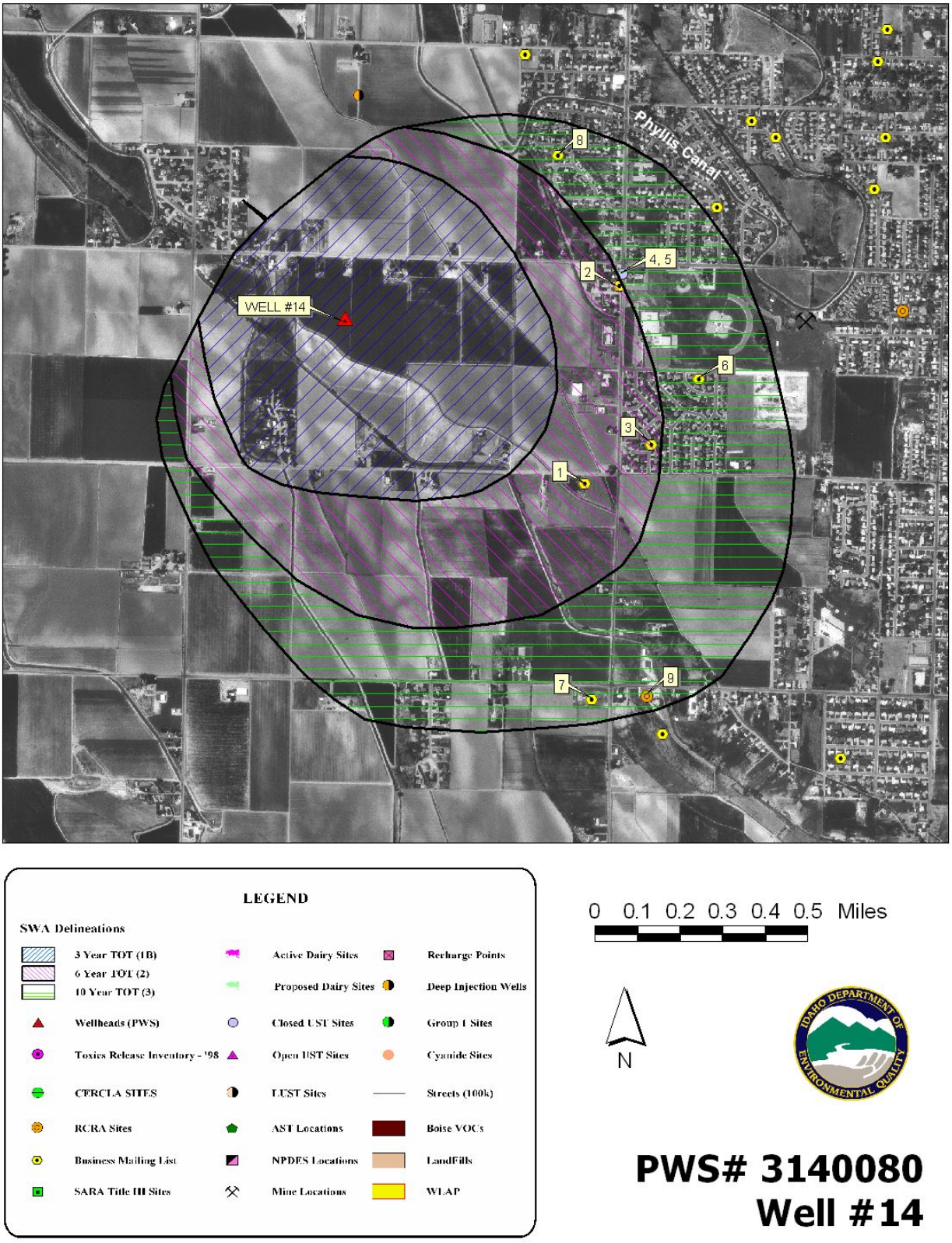

Figure 2. City of Nampa Well #14 delineation and potential contamination sources.

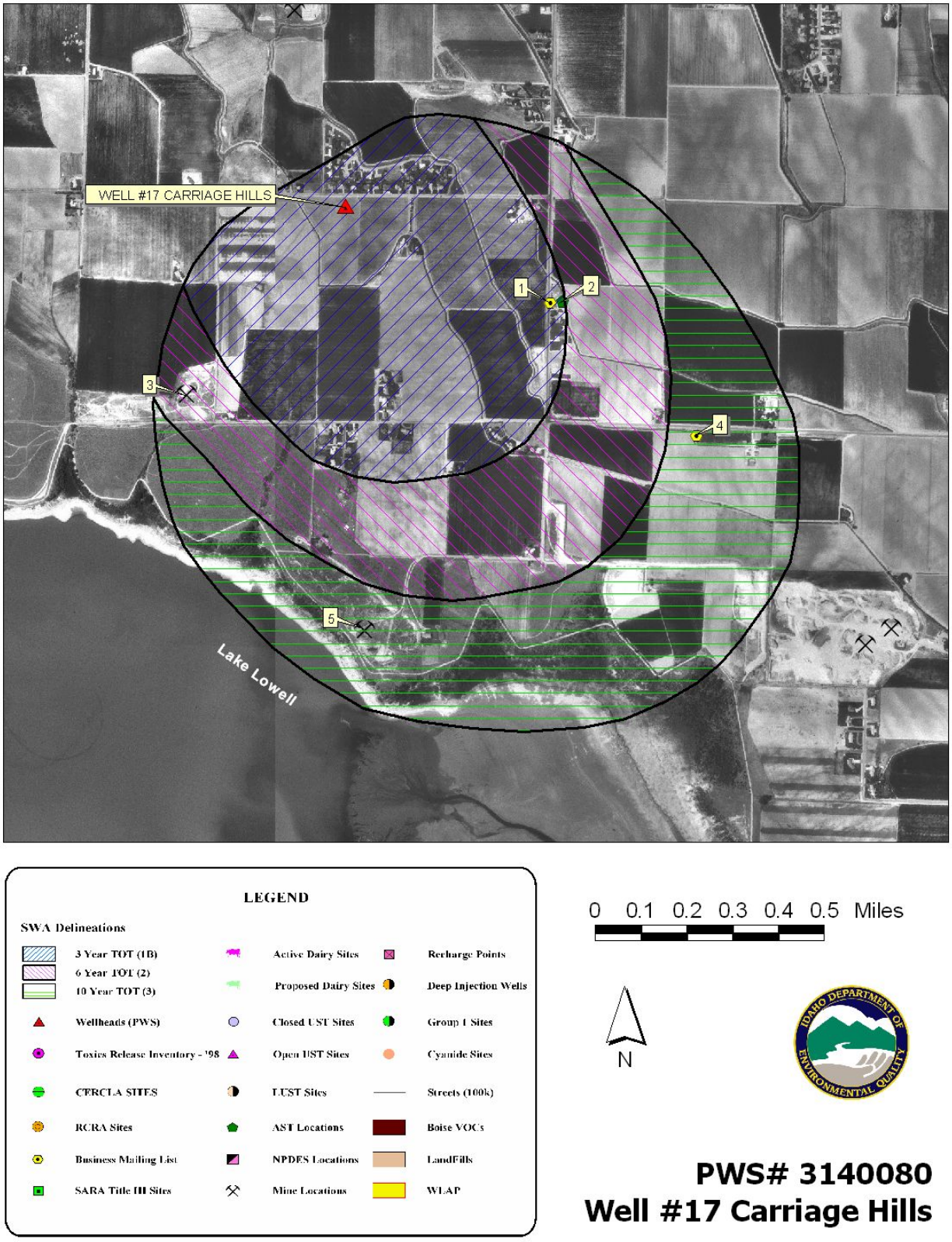

Figure 3. City of Nampa Well #17 Carriage Hills delineation and potential contamination sources.

Section 3. Susceptibility Analyses

The susceptibility of the well to contamination was ranked as *high*, *moderate*, or *low* risk according to the following considerations:

- Hydrologic characteristics
- Physical integrity of the well
- Land use characteristics
- Potentially significant contaminant sources

The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgment. The following summaries describe the rationale for the susceptibility ranking. The susceptibility analysis worksheets have been included in Appendix B of this assessment.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors:

- Surface soil composition
- Material in the vadose zone (between the land surface and the water table)
- Depth to first ground water
- Presence of an aquitard (50 feet of impermeable materials above the producing zone of the well)

Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

The hydrologic sensitivity rated **moderate susceptibility** for both wells. According to the Natural Resource Conservation Service, area soils are classified as *moderately- to well drained.* According to their well logs, the water table depth in both wells is less than 300 feet and aquitards are present in both wells. The vadose zone in Well 14 is composed of predominantly impermeable materials, and the vadose zone in Well 17 Carriage Hills is predominantly permeable materials.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system that can better protect the water. If the casing and annular seal both extend into a low permeability unit then the possibility of cross contamination from other aquifer layers is reduced and the system construction score goes down. If the highest production interval is greater than 100 feet below the water table, then the system is considered to have better buffering capacity. When information was adequate, a determination was made as to whether the casing and annular seals extend into low permeability units and whether current PWS construction standards are met.

The system construction scores rated **low susceptibility** for both Well 14 and Well 17 Carriage Hills.

Both wells are located outside of a 100-year floodplain, and according to their well logs, both the casing and annular seal of each well extend into low-permeability units. Both wells' highest production comes from more than 100 feet below static water levels. The 2003 Sanitary Survey indicates the wellhead and surface seal are maintained.

According to its well log, Well 14 was drilled to a depth of 380 feet bgs. A 20-inch casing (0.375 inches thick) was placed to a depth of 186 feet bgs and seated in brown clay. An annular seal was placed to the same depth. Five screened intervals were placed between 186 feet bgs and 380 feet bgs. The water table was encountered at 13 feet bgs.

According to its well log, Well 17 Carriage Hills was drilled to a depth of 431 feet bgs. An 18-inch casing (0.375 inches thick) was placed from the surface to a depth of 261 feet bgs and seated in tan clay. An annular seal was placed to the same depth. Four screened intervals were placed between 255 feet bgs and 415 feet bgs. The water table was encountered at 53 feet bgs. These well parameters were consolidated in Table 1.

Current PWS well construction standards can be more stringent than when a well(s) was constructed. The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all PWSs to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. Some of the regulations deal with screening requirements, aquifer pump tests, use of a down-turned casing vent, and thickness of casing. Table 1 of the *Recommended Standards for Water Works* (1997) lists the required steel casing thickness for various diameter wells.

Regulations for steel pipe thickness based on size of pipe

Size of pipe (inches)	Thickness (inches)
≤6	0.280
8	0.322
10	0.365
12-20	0.375

Well tests are required at the design pumping rate for 24 hours or until stabilized drawdown has continued for at least six hours when pumping at 1.5 times the design pumping rate.

Because neither well's construction meets all current standards, the wells were assessed an additional system construction point.

Table 1. City of Nampa well construction summary.

	Well Tag No.	Well Depth (feet)	Casing Diameter (inch)	Casing Thickness (inch)	Casing Depth (feet)	Water Table Depth (feet)	Screened Interval (feet)	Surface Seal Depth (feet)	Year Drilled	Well Log Avail.	IDWR/ DEQ Standards Met?
Well 14	15314	380	20 and 16	0.375	0-186 166-188 200-213 219-292 312-341 349-367	13	188-200 213-219 292-312 341-349 367-377	0-186 239-259 316-326	2001	Yes	No
Well 17 Carriage Hills	D9390	431	18 and 10	0.375	+2-261 255-293 303-321 341-367 377-400 415-425	53	293-303 321-341 367-377 400-415	0-261	1999	Yes	No

Potential Contaminant Sources and Land Use

The potential contaminant sources and land use within the delineated zones of water contribution are assessed to determine each well's susceptibility. When agriculture is the predominant land use in the area, this may increase the likelihood of agricultural wastewater infiltrating the ground water system. Agricultural land is counted as a

source of leachable contaminants and points are assigned to this rating based on the percentage of agricultural land.

In terms of potential contaminant sources and land use, Well 14 and Well 17 Carriage Hills rated **moderate susceptibility** for IOCs (e.g., nitrates, arsenic), VOCs (e.g., petroleum products), SOCs (e.g., pesticides), and for microbial contaminants (e.g., bacteria).

The potential contaminant sources existing within the delineated capture zones include Canals and a reservoir, and industrial, agricultural, and service related sources. Additionally, the capture zones intersect a priority area for the IOCs nitrate, and a priority area for the SOCs atrazine and alachlor.

Since the delineated area resides within an agriculturally developed area, agricultural chemicals were also considered in the scoring. In this case, the delineated area exists within a county with high nitrogen fertilizer usage, high herbicide usage, and high overall agricultural chemical usage.

A complete list of the potential contaminant sources is included in Appendix A of this report (Table 3 and 4, page 14). The map shown in Figure 2 and 3 symbolizes the potential contaminant sources within the each well's capture zones. The contaminant sources have been labeled with unique map identifiers (i.e., Map IDs) to reference with the corresponding list of potential contaminant sources in Appendix A.

Final Susceptibility Ranking

Detection above a drinking water standard MCL, any detection of a VOC or SOC, or a confirmed microbial detection at the drinking water source will automatically give a high susceptibility rating, despite the land use of the area, because a pathway for contamination already exists. Additionally, potential contaminant sources within 50 feet of a well will automatically lead to a high susceptibility rating. Having multiple potential contaminant sources in the 0- to 3-year TOT zone (Zone IB) contributes greatly to the overall ranking. In this case, Well 17 Carriage Hills rated automatically high for IOCs, VOCs, SOCs, and microbial contaminants due to a potential contaminant sources existing within 50 feet of the well.

Susceptibility Summary

In terms of total susceptibility, Well 14 rated **moderate susceptibility** for IOCs, VOCs, SOCs and microbial contaminants, and Well 17 Carriage Hills rated **automatically high susceptibility** for IOCs, VOCs, SOCs and microbial contaminants. The hydrologic sensitivity scores were **moderate susceptibility** for both wells, and both wells rated **low susceptibility** for system construction. The potential contaminant/land use scores for both wells were **moderate susceptibility** for IOCs, VOCs, SOCs, and microbial sources. Refer to Table 2 for a summary of the City of Nampa Well 14 and Well 17 Carriage Hills susceptibility evaluation.

Table 2. Summary of City of Nampa Well 14 and Well 17 Carriage Hills susceptibility evaluation.

Drinking Water Source	Susceptibility Scores[1]									
	System Construction	Potential Contaminant Inventory/Land Use				Hydrologic Sensitivity	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well 14	L	M	M	M	M	M	M	M	M	M
Well 17 Carriage Hills	L	M	M	M	M	M	H*	H*	H*	H*

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility; IOC = Inorganic chemical, VOC = Volatile organic chemical, SOC = Synthetic organic chemical
H* = automatically high susceptibility due to potential contaminant sources existing within 50 feet of the wellhead

There are no major issues affecting tested water from this system. According to SDWISS, no VOCs, SOCs, or microbial bacteria have ever been detected in either well. Other IOCs, including, fluoride, sodium, arsenic, thallium, and nitrate have been detected, but at concentrations below MCLs set by EPA.

Section 4. Options for Drinking Water Protection

This source water assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

Characteristics of an Effective Drinking Water Protection Program

An effective drinking water protection program is tailored to the particular drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies.

Drinking water protection activities for City of Nampa should first focus on correcting any deficiencies outlined in the sanitary survey. The purpose of this survey is to inspect a water system every five years, to evaluate the physical condition of that water system's components and its capacity.

It is important to maintain the well's 50-foot setback as an additional protection measure by keeping the pump house clean and not storing disinfection chemicals or other chemicals within this building.

The water system should restrict chemical application and activities near the wellhead. Maintaining the buffer distance reduces the likelihood of contamination related to chemical application or irrigation practices.

Surface water sources located within 200 feet of the wellhead can be a potential source for contamination. Streams, canals, or ditches can transport many types of chemical contaminants that can move quickly, infiltrate soils, and possibly be drawn into ground water.

Any on-site septic systems should be identified and evaluated with respect to effluent discharge near the wellhead.

Protection of the area near the well is crucial, but all aspects of the water system are equally important: other deficiencies can include acquiring a certified Substitute Responsible in Charge Operator, having the ability to isolate the pressure tanks, and developing a written cross connection control program. Furthermore, developing a cross connection control plan will assist the water system in educating homeowners about back flow prevention devices to help reduce the possibility of used water entering distribution lines.

Focus on Long-Term Management Strategies

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies, even though these strategies may not yield results in the near future. It is therefore recommended that City of Nampa consider developing a drinking water protection plan.

Important aspects of a drinking water protection plan include documenting and ranking the potential contaminant sources, outlining best management practices, and educating residents about their drinking water. Multiple resources are available to help communities develop a drinking water protection plan, including the Drinking Water Academy of the EPA. Working with the County, the local Soil Conservation District, and vicinity landowners will better inform the water system of chemicals that may be used, stored, or applied near the drinking water well.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g., zoning, permitting) or non-regulatory in nature (e.g., good housekeeping, public education, specific best management practices). For assistance in protection strategies, please contact the DEQ Boise Regional Office or the Idaho Rural Water Association (IRWA).

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Boise Regional DEQ Office	(208) 373-0550
State DEQ Office	(208) 373-0502
Website:	http://www.deq.idaho.gov/

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper (harperm@idahoruralwater.com) with IRWA, at (208) 343-7001, for assistance with drinking water protection strategies.

List of Acronyms and Definitions

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

bgs (Below Ground Surface) – Depth below the surface of the ground.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as "Superfund" is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few heads to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of storm water runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is FEMA data for the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within a priority one area.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5 mg/L.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25% of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

Sanitary Survey – An onsite review of the water source, facilities, equipment, operation, and maintenance of a public water system for the purpose of evaluating the adequacy of such source, facilities, equipment, operation, and maintenance for producing and distributing safe drinking water.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

References Cited

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environment Managers, 1997. "Recommended Standards for Water Works."

Idaho Division of Environmental Quality Ground Water Program, October 1999. Idaho Source Water Assessment Plan.

Idaho Department of Environmental Quality. 2003. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

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Idaho Department of Environmental Quality Spatial Database Engine (SDE).

Idaho Department of Environmental Quality, 2005. Source Water Assessment Capture Zone Delineation, PWS #3140080 – City of Nampa (Well 14 and Well 17 Carriage Hills)

Idaho Department of Water Resources, 2002, Well Driller's Report for City of Nampa. Tag No. 15314 and D9390.

Appendix A. City of Nampa Well 14 and Well 17 Carriage Hills Potential Contaminant Source Inventories

Table 3. City of Nampa Well 14 potential contaminant sources.

Map ID	Contaminant Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
1	Sign manufacturer	3-6 YR	Database Search	IOC, VOC, SOC
2	Landscape contractor	3-6 YR	Database Search	IOC, VOC, SOC
3	Swimming pool contractor, dealer, design	3-6 YR	Database Search	IOC, VOC, SOC
4, 5	UST site (closed); LUST site (cleanup complete; impact unknown)	6-10YR	Database Search	VOC, SOC
6	Drilling and boring contractor	6-10YR	Database Search	IOC, VOC, SOC
7	Veterinarian	6-10YR	Database Search	IOC, SOC
8	Farm equipment manufacturer	6-10YR	Database Search	IOC, VOC, SOC
9	RCRA site	6-10YR	Database Search	VOC
	Canals	0-10 YR	Map	IOC, VOC, SOC, Microbial bacteria

[1] Refer To Potential Contaminant Inventory List Of Acronyms And Definitions
[2]TOT = Time-of-travel (in years) for potential contaminant to reach the wellhead
[3]IOC = Inorganic chemical; VOC = Volatile organic chemical; SOC = Synthetic organic chemical

Table 4. City of Nampa Well 17 Carriage Hills potential contaminant sources.

Map ID	Contaminant Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
1	Seeds & bulb wholesaler	0-3 YR	Database Search	IOC, SOC
2	AST site	0-3 YR	Database Search	VOC, SOC
3	Gravel pit	3-6 YR	Database Search	IOC, VOC, SOC
4	Landscape contractor	6-10YR	Database Search	IOC, VOC, SOC
5	Gravel pit	6-10YR	Database Search	IOC, VOC, SOC
	Canals, Lake Lowell	0-10 YR	Map	IOC, VOC, SOC, Microbial bacteria

[1] Refer To Potential Contaminant Inventory List Of Acronyms And Definitions
[2]TOT = Time-of-travel (in years) for potential contaminant to reach the wellhead
[3]IOC = Inorganic chemical; VOC = Volatile organic chemical; SOC = Synthetic organic chemical

Appendix B. City of Nampa Well 14 and Well 17 Carriage Hills Susceptibility Analysis Worksheets

Susceptibility Analysis Formulas

Intermediate Scoring for System Construction, Hydrologic Sensitivity, and Potential Contaminant/Land Use:

0 – 1 Low
2 – 4 Moderate
5 – 6 High

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility
6 - 12 Moderate Susceptibility
≥ 13 High Susceptibility

Ground Water Susceptibility Report Public Water System Name: CITY OF NAMPA 3140080 Source: WELL 14 Date: 3/02/2006

1. System Construction		SCORE			
Drill Date	6/29/01				
Driller's Log Available	YES				
Sanitary Survey (if yes, indicate date of last survey)	YES	2001			
Well meet construction standards	NO	1			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	YES	0			
Highest production 100 feet below static water level	YES	0			
Well located outside the 100 year flood plain	YES	0			
Total System Construction Score		1 (Low)			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	NO	2			
Vadose zone composed of gravel, fractured rock or unknown	NO	0			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	YES	0			
Total Hydrologic Score		3 (Moderate)			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED AGRICULTURE	2	2	2	2
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	NO	0	0	0	0
(Score = # Sources X 2) 8 Points Maximum		0	0	0	0
Sources of Class II or III leacheable contaminants or	YES	4	0	0	
4 Points Maximum		4	0	0	
Zone 1B contains or intercepts a Group 1 Area	YES	2	0	2	0
Land use Zone 1B	>50% Irrigated Agricultural Land	4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		8	4	6	4
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	>50% Irrigated Agricultural Land	2	2	2	
Potential Contaminant Source / Land Use Score - Zone II		5	5	5	
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	
Cumulative Potential Contaminant / Land Use Score		20 (M)	14 (M)	18 (M)	6 (M)
4. Final Susceptibility Source Score		8	7	8	6
5. Final Well Ranking		Moderate	Moderate	Moderate	Moderate

Ground Water Susceptibility Report Public Water System Name: CITY OF NAMPA 3140080 Source: WELL 17 Carriage Hills Date: 3/2/2006

1. System Construction		SCORE			
Drill Date	6/01/99				
Driller's Log Available	YES				
Sanitary Survey (if yes, indicate date of last survey)	YES	2003			
Well meet construction standards	NO	1			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	YES	0			
Highest production 100 feet below static water level	YES	0			
Well located outside the 100 year flood plain	YES	0			
Total System Construction Score		1 (Low)			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	NO	2			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	N0	1			
Aquitard present with > 50 feet cumulative thickness	YES	0			
Total Hydrologic Score		4 (Moderate)			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED AGRICULTURE	2	2	2	2
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	YES	YES	YES	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	2	2	3	1
(Score = # Sources X 2) 8 Points Maximum		4	4	6	2
Sources of Class II or III leacheable contaminants or	YES	5	2	2	
4 Points Maximum		4	2	2	
Zone 1B contains or intercepts a Group 1 Area	YES	2	0	2	0
Land use Zone 1B	>50% Irrigated Agricultural Land	4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		12	10	12	6
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	>50% Irrigated Agricultural Land	2	2	2	
Potential Contaminant Source / Land Use Score - Zone II		5	5	5	
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	
Cumulative Potential Contaminant / Land Use Score		24 (M)	20 (M)	24 (M)	8 (M)
4. Final Susceptibility Source Score		10	9	10	8
5. Final Well Ranking		Auto-high	Auto-high	Auto-high	Auto-high

Report Index

Well 14 Driller's Log

Form 238 11/97 JAN. 7.2002 2:39PM NO.643 P.5/6

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

866558-
768318

Office Use Only
Inspected by: _____
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: Long:

1. WELL TAG NO. D 15314
DRILLING PERMIT NO. _____
Other IDWR No. 63-12591

2. OWNER:
Name City of NAMPA #14
Address 411 Third Street South
City NAMPA State ID Zip 83651

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

Twp. 3 North ☒ or South ☐
Rge. 2 East ☐ or West ☒
Sec. 29 NE 1/4 NE 1/4 SW 1/4
Gov't Lot ____ County CANYON
Lat: Long:
Address of Well Site W. ROOSEVELT AVE
3000' WEST OF MIDLAND BLVD City _____
(Give at least north or east + Distance to Road or Landmark)
Lt. _____ Blk. _____ Sub. Name _____

4. USE:
☐ Domestic ☒ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other _____

6. DRILL METHOD
☐ Air Rotary ☐ Cable ☐ Mud Rotary ☒ Other REVERSE ROTARY

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
BENTONITE	0	186	36050	OVER BORE
BENTONITE	239	259	2800	DRY POUR
BENTONITE	316	336	1400	

Was drive shoe used? ☐Y ☒ N Shoe Depth(s) _____
Was drive shoe seal tested? ☐ Y ☐ N How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
20"	+3	186	.375	Steel	☒	☐	☒	☐
16"	166	188	.375	Steel	☒	☐	☒	☐
16"	200	213	.375	Steel	☒	☐	☒	☐

SEE ATTACHED SHEET
Length of Headpipe _____ Length of Tailpipe 3'

9. PERFORATIONS/SCREENS
Perforations Method _____
Screens Screen Type JOHNSON WIRE WRAP

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
188'	200	.030		16	SS	☒	☐
213	219	.030		16	SS	☒	☐
222	312	.030		16	SS	☒	☐

SEE ATTACHED SHEET

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
13 ft. below ground Artesian pressure ____ lb.
Depth flow encountered _____ ft. Describe access port or control devices: 2" I.S.

11. WELL TESTS:
☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
2000	65.8	78.2'	2 hrs

Water Temp. 62° Bottom hole temp. _____
Water Quality test or comments: _____ Depth first Water Encounter _____

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
28	0	5	TOP SOIL		
	5	19	BURNT BRN CLAY W/ SAND MIX	✓	
	19	36	LT TAN COARSE SAND		
	36	42	BRN CLAY		
	42	56	LT TAN COARSE SAND		
	56	57	BURNT BRN CLAY		
	57	59	FINE BRN SAND		
	59	61	BURNT BRN CLAY		
	61	64	COARSE BRN SAND		
	64	106	BURNT BRN CLAY		
	106	176	SAND, GRAVEL, RIVER ROCK		
	176	178	SANDY TAN CLAY		
	178	181	SAND, GRAVEL		
	181	188	BRN CLAY		
	188	198	SAND, GRAVEL		
	198	200	FINE SAND		
	200	203	TAN CLAY		
	203	206	FINE SAND		
	206	213	TAN CLAY		
	213	219	MED SAND		
	219	225	TAN CLAY		
	225	229	MED SAND		
	229	277	TAN CLAY		
	277	279	MED SAND		
	279	284	TAN CLAY		
	284	288	MED SAND		
	288	292	TAN CLAY		
	292	312	MED SAND		
	312	341	TAN CLAY		
	341	349	FINE-MED SAND		
	349	367	TAN CLAY W/ SAND STREAKS		
	367	377	MED SAND		
	377	380	TAN CLAY		

RECEIVED
JAN 07 2002
WATER RESOURCES WESTERN REGION

Completed Depth 380' (Measurable)
Date: Started 5-15-01 Completed 6-29-01

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name RIVERSIDE INC Firm No. 333
Firm Official and Driller or Operator _____ Date 7-9-01
(Sign Once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

JAN. 7.2002 2:40PM NO.643 P.6/6

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Inspected by _____
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : Long: :

1. WELL TAG NO. D 15314
DRILLING PERMIT NO. _____
Other IDWR No. 63-12591

2. OWNER:
Name CITY OF NAMPA
Address 411 THIRD STREET SOUTH
City NAMPA State ID Zip 83651

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

N / W / E / S

Twp. 3 North ☒ or South ☐
Rge. 2 East ☐ or West ☒
Sec. 29 NE 1/4 NE 1/4 SW 1/4 (10 acres / 160 acres)
Gov't Lot ___ County CANYON
Lat: : : Long: :
Address of Well Site W. ROOSEVELT AVE.
3000' WEST OF MIDLAND BLVD (Give at least name of road + Distance to Road or Landmark) City _____
Lt. _____ Blk. _____ Sub. Name _____

4. USE:
☐ Domestic ☒ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other _____

5. TYPE OF WORK check all that apply (Replacement, etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other _____

6. DRILL METHOD
☐ Air Rotary ☐ Cable ☐ Mud Rotary ☒ Other REVERSE

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
3/16 ESSI	176	239	51,800	POUR
SAND FILTER	259	316	5	
BACK	326	380	5	

Was drive shoe used? ☐Y ☐ N Shoe Depth(s) _____
Was drive shoe seal tested? ☐ Y ☐ N How? _____

8. CASING/LINER: CONT.

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
16	219	292	375	Steel	☒	☐	☒	☐
16	312	341	375	Steel	☒	☐	☒	☐
16	349	367	375	Steel	☒	☐	☒	☐

Length of Headpipe _____ Length of Tailpipe _____

9. PERFORATIONS/SCREENS CONT.
Perforations Method _____
Screens Screen Type JOHNSON WIRE WOUND

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
341	349	.030		16	SS	☒	☐
367	377	.030		16	SS	☒	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
13 ft. below ground Artesian pressure ____ lb.
Depth flow encountered _____ ft. Describe access port or control devices: _____

11. WELL TESTS:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

Water Temp. _____ Bottom hole temp. _____
Water Quality test or comments: _____
Depth first Water Encounter _____

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N

RECEIVED
JAN 07 2002
WATER RESOURCES WESTERN REGION

Completed Depth _____ (Measurable)
Date: Started 5-25-01 Completed 6-29-01

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name RIVERSIDE INC Firm No 333
Firm Official and Driller's Signature _____ Date _____
Date 7-9-01
(Signature if Firm Official's Duplicate)

FORWARD WHITE COPY TO WATER RESOURCES

Well 17 Carriage Hills Driller's Log

orm 238-7
4/92

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER D 9390
Name United Water Idaho, Inc
Address 8248 West Victory Road, P.O. 9498
Drilling Permit No. 63-99-W-0244-000
Water Right Permit No. 63-12463

2. NATURE OF WORK
☒ New well ☐ Deepened ☐ Replacement
☐ Well diameter increase ☐ Modification
☐ Abandoned (describe abandonment or modification procedures such as liners, screen, materials, plug depths, etc. in lithologic log, section 9.)

3. PROPOSED USE
☐ Domestic ☐ Irrigation ☐ Monitor
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other Municipal (specify type)

4. METHOD DRILLED
☐ Rotary ☐ Air ☐ Auger ☒ Reverse rotary
☐ Cable ☐ Mud ☐ Other _____ (backhoe, hydraulic, etc.)

5. WELL CONSTRUCTION
Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
.375 inches	18 inches +	2 feet	261 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

Was casing drive shoe used? ☐ Yes ☒ No
Was a packer or seal used? ☒ Yes ☐ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch ☐ Gun
Size of perforation? _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

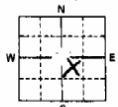
Well screen installed? ☒ Yes ☐ No
Manufacturer Johnson Type Wirewrap
Top Packer or Headpipe 255'
Bottom of Tailpipe See attachment
Diameter ____ Slot size ____ Set from ____ feet to ____ feet
Diameter ____ Slot size ____ Set from ____ feet to ____ feet
Gravel packed? ☐ Yes ☐ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet

Surface seal depth ___ Material used in seal: ☐ Cement grout ☐ Bentonite ☐ Puddling clay ☐ _____
Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing ☐ Overbore to seal depth
Method of joining casing: ☐ Threaded ☐ Welded ☐ Solvent Weld ☐ Cemented between strata

Describe access port 2"

MICROFILMED
AUG 25 1999

6. LOCATION OF WELL
Sketch map location **must** agree with written location.



Subdivision Name Carriage Hill
Lot No. _____ Block No. _____
County Canyon
Address of Well Site Iowa Ave. (give at least name of road)
NW ¼ SE ¼ Sec. 31 T. 3 N ☒ or S ☐ R. 2 E ☐ or W ☒

7. WATER LEVEL
Static water level 93' feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature 70.5 °F. Quality Great
Describe artesian or temperature zones below.

8. WELL TEST DATA
☒ Pump ☐ Bailer ☐ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped
700	104.5	7.5 hrs

9. LITHOLOGIC LOG 090975

Bore Diam.	Depth From	Depth To	Material	Water Yes	Water No
28"	0	11	Topsoil		
	11	13	Cheache		
	13	85	Sand & Gravel		
	85	210	Brn Clay Stks Sand		
	210	223	Coarse Sand Stks Clay		
	223	260	Clay Sand Mix		
	260	266	Tan Clay		
18"	266	296	Tan Clay Stks Sand		
	296	301	Fine to Coarse Sand		
	301	305	Tan Clay		
	305	327	Tan Clay		
	327	333	Fine to Med Sand		
	333	337	Brn Clay & Sand		
	337	340	Fine Sand		
	340	365	Tan Clay Stks Sand		
	365	392	Fine to Med Sand		
	392	394	Clay Sand mix		
	394	399	Fine Sand		
	399	396	Tan Clay		
	396	415	Fine Med Sand		
	415	416	Clay & Sand mix Blue		
	416	417	Fine to Med Sand		
	417	424	Blue Clay		
	424	431	Sand & Clay		

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JUN - 4 1999
Department of Water Resources

10. Work started 4-20-99 finished 6-1-99

11. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.
Firm Name Riverside Inc Firm No. 333
Address P.O. Box 920 Date 6-2-99
Signed by Drilling Supervisor _____
and
(Operator) _____ *(if different than the Drilling Supervisor)*

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

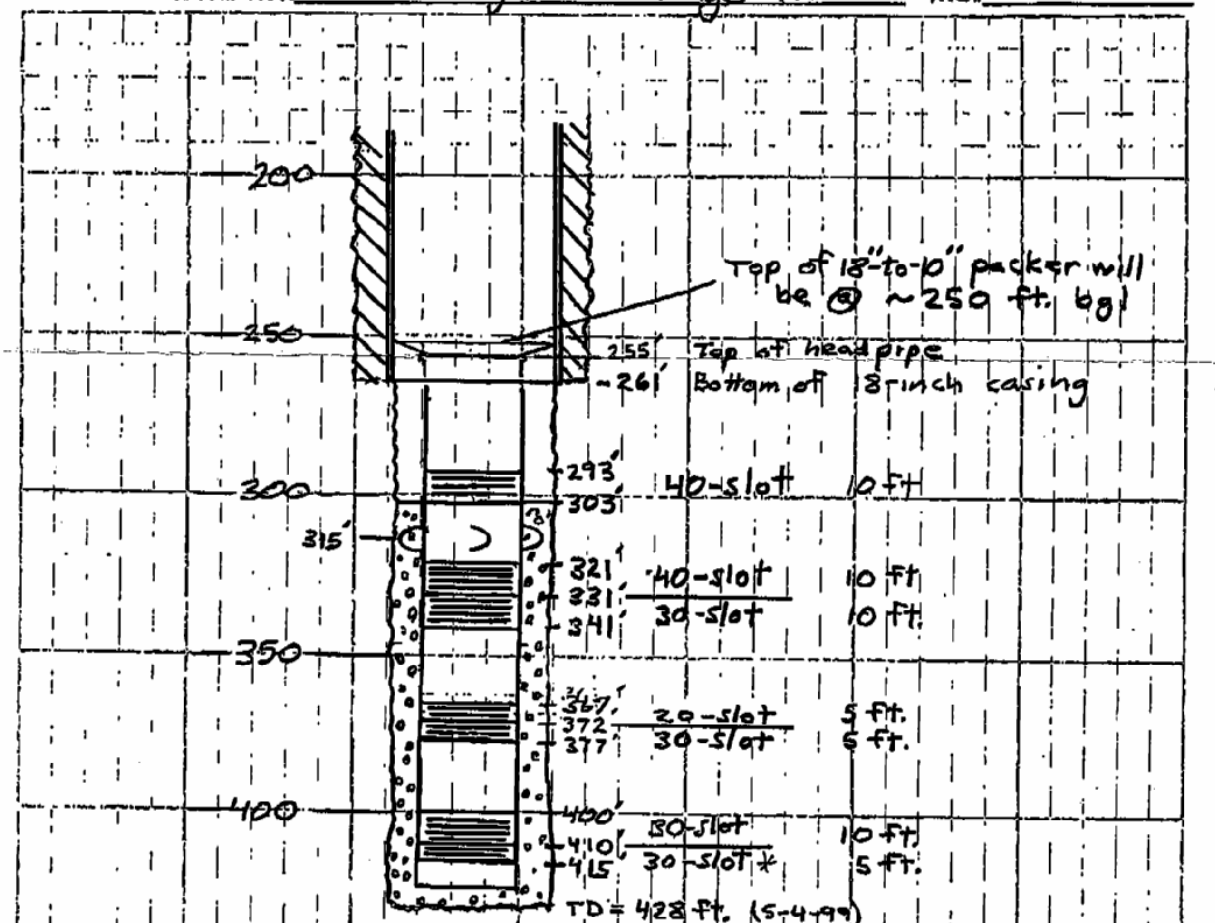
MAY. 5.1999 4:37PM UNITED WATER NO.569 P.2/2

63-99-W-0244-000

95918 SHEET 1 OF 1

BY Dittus DATE Cinco de Mayo 1999 PROJECT _____ CONTACT _____

DESCRIPTION Final Design - Carriage Hill IWO# _____



Depth (bgl)		Materials	Length
255 ft	to 293 ft	10-inch (.365"-wall) casing "blank"	38 ft.
293	303	stainless 40-slot	10
303	321	blank	18
321	331	stainless 40-slot	10
331	341	stainless 30-slot	10
341	367	blank	26
367	372	stainless 20-slot	5
372	377	stainless 30-slot	5
377	400	blank	23
400	410	stainless 30-slot	10
410	415	stainless 30 slot	5
415	425	blank (tail pipe)	10

55 ft. total screen 115 ft. of 10-inch casing

MICROFILMED AUG 25 1999